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ABSTRACT

This activity is designed to use a collection of marine bivalve shells. From these shells, students can determine approximate ages of the shells, compare weather conditions to shell ages, and learn problems of this technique. (RH)

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How Long Do Marine Organisms Live?

Investigations in the Marine Environment for Children.

by

Richard M. Schlenker

SE 021 376

Abstract

Students make shell collections of various species of marine bivalves. They determine the ages of members of the collection, using the annual ring method. They also investigate the problems encountered in using this method. Approximate shell ages are compared with weather records in an attempt to ascertain whether the approximate age and the true age are the same.

Introduction

When asked how old a certain tree was, most people would respond saying that the tree must first be cut down before a determination could be made. After the tree was cut, it would be necessary to count the annual rings. One area of spring xylem and one area of summer xylem constitutes one annual ring. Of course, with certain reservations, the number of annual rings is equivalent to the age of the tree.

Suppose you were to ask the same person how he might determine the age of a soft shell clam (Mya arenaria), a hard shell clam (Mercenaria mercenaria), a blue mussell (Mytilus edulis), a horse mussell (Modiolus modiolus), a ribbed mussel (Modiolis demissus) or some other bivalve mollusk what would be their reply? Most likely they would reply by saying, "I don't know."

Careful examination of a valve of any species mentioned above, as well as others will show a series of lines. These lines are more or less parallel to one another and each represents a year of growth.

There is, however, one problem with this aging method. Extreme environmental conditions and environmental fluctuations have been known to cause the production of a false ring. For this reason, it is wise not to be too dogmatic about the age. In the same light, though, this method is excellent for determining the approximate age.

Objectives

1. To develop observational skills.

2. To introduce students to a method of determining the approximate age of bivalve mollusks.

Goals

As a result of participation in this unit, the student will:

1. be able to determine approximate age of a bivalve specimen by counting the number of rings,

2. be aware of and be able to discuss the limitations of this method in determining a specimen's age,

3. be able to check local weather records in an attempt to ascertain whether the approximate age as determined by the counting of rings and the true age are the same.

Materials

1. A bivalve shell collection from a local or known area. There may be one or several species.

2. Several hand lenses.

3. Note paper.

Procedures

1. Conduct a group discussion in which this method of aging is discussed, as well as its' limitations.

2. Have each student examine a shell. The shell should be examined with a hand lens and the naked eye.

3. Have each student determine the age of several specimens, and record the ages.

4. Each student will make his/her sample collection with a partner.

5. The partner should determine the age of his partner's sample.

6. A committee of students is then sent to a local seaside area to collect live specimens. The following types of specimens should be obtained:

   A. Several specimens of the same species, e.g., blue mussels. Within this collection, at least two members should be as close as possible to the same size;

   B. Several specimens of different species.

7. Return to school and determine the age of the collection.

   A. Do specimens of the same size and of the same species have the same number of rings?

   B. Are there members of different species which are about the same age?

   C. Record all data.

8. Using local library resources, determine periods of recent extreme environmental fluctuations. The time span should be as great as the oldest shell any class member has.

9. Compare weather records with the ages of the various shells.

   A. Has the weather been constant over the previously determined age of the shell?

10. Hypothesize an approximate age range in years, based upon all data which has been collected.

Evaluation

1. Give each student a collection of shells of different species. Have each student determine an approximate age for each specimen in his collection.

2. Discuss the limitations of this form of age determination.

Suggestions for Further Study

1. Investigate the aging of fish. Is there a method which is analogous to the one studied here?

2. Investigate the limitations of aging trees using the annual ring method for determining age.